MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The REVIEW for February, 1897, is based on 2,764 reports from stations occupied by regular and voluntary observers, classified as follows: 142 from Weather Bureau stations; numerous special river stations; 33 from post surgeons, received through the Surgeon General, U. S. Army; 2,547 from voluntary observers; 96 received through the Southern Pacific Railway Company; 14 from Life-Saving stations, received through the Superintendent United States Life-Saving Service; 32 from Canadian stations; 1 from Hawaii; 20 from Mexican stations. International simultaneous observations are received from a few stations and used together with trustworthy newspaper extracts and special reports.

The WEATHER REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe. Unless otherwise specifically noted, the text is written by the Editor, but the meteorological tables contained in the last section are furnished by Mr. A. J. Henry, Chief of the Division of Records and Meteorological Data. Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada, Mr. Curtis J. Lyons, Meteorologist to the Government Survey, Honolulu, and Dr. Mariano Bárcena, Director of the Central Meteorological Observatory of Mexico.

CLIMATOLOGY OF THE MONTH.

GENERAL CHARACTERISTICS.

The month was generally slightly warmer than the normal; the principal deficits were on the southern Plateau and the northern Slope. The rain and snowfall was generally in excess in the south Atlantic and east Gulf States, and on the Pacific Coast, but deficient over the Lake Region, New England, and the Mississippi Valley. The snowfall was abundant and well preserved so that east of the Rocky Mountains it was deeper than usual at the close of the month. The barometric pressure was everywhere deficient, except in New England and the St. Lawrence Valley. Notable river floods were reported in the Ohio and elsewhere.

ATMOSPHERIC PRESSURE.

[In inches and hundredths.]

The distribution of mean atmospheric pressure reduced to sea level, as shown by mercurial barometers, not reduced to standard gravity, and as determined from observations taken daily at 8 a. m. and 8 p. m. (seventy-fifth meridian time), is shown by isobars on Chart IV. That portion of the reduction to standard gravity that depends on latitude is shown by the numbers printed on the right-hand border.

The *mean pressures* during the current month were high throughout the Atlantic States, and highest over the Rocky Mountain Plateau Region. They were low in the extreme northeastern and northwestern portions of the United States; they were lowest in the Canadian Provinces, Newfoundland, and British Columbia. The reduced pressures were highest: In the United States, Idaho Falls and Salt Lake City, 30.14; Carson City, 30.13; Harrisburg, 30.12; San Luis Obispo, Huron, Northfield, Lynchburg, Atlanta, Charleston, Tampa, Jupiter, and Key West, 30.11; in Canada, White River, 30.14; Winnipeg, Minnedosa, and Battleford, 30.10. The lowest were: In the United States, Tatoosh Island, 29.91; Fort Canby, 29.92; Portland, Oreg., 29.97; Spokane, 29.99; in Canada, St. Johns, N. F., 29.73; Esquimault, 29.91; Sydney, 29.94.

As compared with the normal for February, the mean pressure was in excess in New England and the St. Lawrence Valley; elsewhere it was deficient. The greatest excesses were: In the United States, Eastport, 0.07; Northfield, 0.05; Albany, 0.04; in Canada, White River, 0.06; Charlottetown, 0.05; Father Point and Halifax, 0.04. The greatest deficits were: United States, Havre and Rapid City, 0.14; Pueblo, 0.13; Spokane and Miles City, 0.12; Tatoosh Island, Roseburg, and Walla Walla, 0.11; Canada, St. Johns, N. F., 0.19; Medicine Hat, 0.12; Swift Current, 0.09; Calgary and Qu'Appelle, 0.07.

As compared with the preceding month of January, the pressures reduced to sea level show a rise over New England, Ontario, and Quebec and a fall over Newfoundland and the rest of Canada and the United States. The greatest rises were: United States, Sault Ste. Marie, 0.04; Northfield, Eastport, and Portland, Me., 0.03; Canada, Father Point, 0.08; Quebec, 0.05; Chatham and White River, 0.04. The greatest falls were: United States, Lander, 0.27; Helena, 0.25; Walla Walla, 0.24; Spokane, 0.23; Abilene, 0.22; Pueblo, Amarillo, and Oklahoma, 0.21; Canada, Kamloops, 0.26; Banff, 0.21; Medicine Hat, 0.19; Edmonton, 0.18.

AREAS OF HIGH AND LOW PRESSURE.

By Prof. H. A. HAZEN.

During the month the tracks of eight highs and eleven lows have been sufficiently defined to be mapped (see Charts I and II). The accompanying table presents the principal facts regarding the place of origin and disappearance of these highs and lows.

In general the highs have taken a rather high latitude or

elee have followed nearly the same path through the center of the country (see Chart I). No. V began in the middle Plateau Region, and No. VIII off the north Pacific Coast; all the other highs originated, or were first seen, to the north of Montana or Lake Superior. No. III was last noted in the middle St. Lawrence Valley, I and VI near Newfoundland, and all the rest near the middle Atlantic Coast.

The lows were much more uniformly distributed over the country than the highs (see Chart II). No. III was first noted off the north Pacific Coast, and VIII off the middle Pacific; IV and VI were first noted in Arizona, and I, II, IX, and X north of the Gulf of Mexico; V, VII, and XI were first noted to the north of Montana. The common locus of nearly all was over or near Newfoundland. Nos. I and III disappeared off or near the middle Atlantic Coast, and IX in the middle St. Lawrence Valley.

Highest temperatures during the third decade of February were recorded during the passage of low No. IX.

High winds of 70 miles per hour at Block Island occurred p. m. of 3d as low No. I passed off the Atlantic Coast. Winds of 60 miles per hour were reported p. m. of 6th from New York as low No. II passed toward the Atlantic. The remaining storms of the month were of slight intensity. As No. II approached the Atlantic the heaviest precipitation of the month was reported, 3.24 inches in twenty-four hours, at Augusta, and 3.10 inches at Tampa, a. m. of the 6th.

The lowest temperature of the third decade of February was reported on the 26th during the passage of high area No. VIII.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	1, p.m.	52	94	7, a.m.	52	56	2,270	5.5	413	17.2
II	5, a.m.	54	116	9, p.m.	40	80	2,120	4.5	471	19.6
III	8, a.m.	50	99	12, a.m.	47	71	1,360	4.0	340	14.2
IV	12, p.m.	52	89	14, a.m.	38	73	1,190	1.5	793	33.0
V	16, p.m.	42	119	20, p.m.	41	69	2,630	4.0	658	27.4
VI	19, a.m.	54	109	23, a.m.	48	61	2,240	4.0	560	23.3
VII	22, a.m.	49	111	24, p.m.	37	74	2,320	2.5	929	38.7
VIII	24, p.m.	47	126	28, a.m.	37	78	2,990	3.5	855	35.6
Total							17,120	29.5	5,019	
Mean of 8 tracks							2,140	3.7	627	26.1
Mean of 29.5 days									580	24.2
Low areas.										
I	1, a.m.	32	86	2, p.m.	37	73	830	1.5	548	22.8
II	2, p.m.	38	103	9, a.m.	47	60	3,270	6.5	503	21.0
III	3, p.m.	47	127	8, a.m.	38	82	3,350	4.5	744	31.0
IV	8, a.m.	34	113	13, a.m.	48	56	3,700	5.0	740	30.8
V	10, p.m.	53	113	15, a.m.	49	61	3,210	4.5	713	29.7
VI	13, a.m.	35	113	17, a.m.	49	56	3,530	4.0	882	36.8
VII	14, p.m.	53	118	20, a.m.	45	57	3,210	5.5	584	24.3
VIII	18, p.m.	40	124	22, a.m.	50	56	3,380	3.5	965	40.2
IX	20, p.m.	36	99	23, p.m.	48	73	1,810	3.0	603	25.1
X	22, a.m.	36	91	24, a.m.	47	56	1,970	2.0	987	41.1
XI	23, a.m.	53	111	26, a.m.	45	59	2,990	3.0	998	41.6
Total							31,240	43.0	8,267	
Mean of 11 tracks							2,840	3.9	752	31.3
Mean of 43 days									727	30.3

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The mean temperature is given for each station in Table II, for voluntary observers. Both the mean temperatures and the departures from the normal are given in Table I for the regular stations of the Weather Bureau, which also gives the height of the thermometers above the ground at each station.

The *monthly mean temperatures* published in Table I, for the regular stations of the Weather Bureau, are the simple means of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

The *regular diurnal period* in temperature is shown by the hourly means given in Table V for 29 stations selected out of 82 that maintain continuous thermograph records.

The *distribution of the observed monthly mean* temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart IV; the lines are drawn over the Rocky Mountain Plateau region, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *highest mean temperatures* were: Key West, 72.7; Jupiter, 69.4; Tampa, 65.2; Corpus Christi, 61.4; Jacksonville, 60.0; in Canada, Esquimault, 40.0; Kamloops, 29.2; Port Stanley, 25.0; Toronto, 24.6; Saugeen, 21.7. The lowest were: Williston, 6.3; Bismarck, 6.6; Moorhead, 7.8; Huron, 10.4; Havre, 11.2; in Canada, Prince Albert, —2.4; Battleford, —1.6; Minnedosa, —1.3; Winnipeg, —0.3.

As compared with the normal for February the mean temperature for the current month was in excess over the Lake Region, New England, the Mississippi and Missouri valleys, the northern Plateau and north Pacific Slope. It was deficient in the Southern Plateau and south Pacific Slope, the central Gulf and upper Missouri. The greatest excesses were: In the United States, Idaho Falls, 8.3; Greenbay, 6.2; Duluth, 5.6; Alpena, 5.5; Marquette, 5.4; in Canada, Port Arthur, 5.9; Port Stanley, 5.2; Calgary, 5.1. The largest deficits were: Carson City, 5.5; Port Eads, 4.5; Havre, 3.7; Canada: St. Johns, N. F., 2.4; Charlottetown, 1.1.

Considered by districts the mean temperatures of the current month show departures from the normal as given in Table I. The greatest positive departures were: Upper Lake, 4.2; northern Plateau, 5.4. The greatest negative departures were: Southern Plateau, 1.6; middle Plateau, 3.3.

The years of highest and lowest mean temperatures for February are shown in Table I of the REVIEW for February, 1894. The mean temperature for the current month was the highest on record at: Abilene, 51.8; Baker City, 29.6; Greenbay, 23.2. The mean temperature was the lowest on record only at Carson City, 30.1.

The *maximum and minimum temperatures* of the current month are given in Table I. The highest maxima were: 86, Jupiter (25th); 85, Abilene (17th) and San Antonio (18th); 84, Jacksonville and Corpus Christi (22d); 83, Los Angeles (26th) and Yuma (28th). The lowest maxima were: 32, Williston (frequently); 33, Bismarck (16th) and Moorhead (20th); 34, Duluth (20th); 36, Sault Ste. Marie (3d), St. Paul (13th), and Duluth (20th). The highest minima were: 58, Key West (4th); 46, Jupiter (3d); 39, Tampa (28th); 38, San Francisco (20th), San Diego (22d), and Charleston (28th). The lowest minima were: —30, Moorhead (26th); —25, Williston, Bismarck, and Huron (26th); —22, St. Paul (26th); —21, Minneapolis and Sault Ste. Marie (26th).

The *limits of minimum temperatures*, 32° and 40°, are shown by lines on Chart No. V.

The *years of highest maximum and lowest minimum temperatures* for February are given in the last four columns of Table I of the REVIEW for 1896. During the current month the maximum temperatures were equal to or above the highest on record at: Abilene, 85; Palestine and Fort Smith, 82; Shreveport, 81; Little Rock, 78. The minimum temperatures were equal to or below the lowest on record only at: Carson City, —14.

The *greatest daily range of temperature and the data for computing the extreme and mean monthly ranges* are given for each of the regular Weather Bureau stations in Table I. The